



CITY OF SACRAMENTO

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DEPARTMENT OF PUBLIC WORKS

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M. H. JOHNSON
Director

February 6, 1985

Budget & Finance Committee, and
Transportation and Community
Development Committee
Sacramento, California

Honorable Members in Session:

SUBJECT: The Street Maintenance Story

SUMMARY:

The attached report has been prepared to explain in non-technical terms why it will cost a great deal of money to get back to the adequate preventative street maintenance program that used to exist in Sacramento.

BACKGROUND:

Senator Foran has introduced SB-290 to increase gasoline taxes by five cents per gallon. Among other things, this bill would provide three cents for local streets and roads. He has pointed out that local streets throughout the State are deteriorating at an alarming rate. The attached report describes the situation in this city.

On the recent State Capitol visit, 1985 members of the Sacramento Metropolitan Chamber of Commerce met with many State officials to discuss transportation funding problems in this area. Most of the discussion centered around Senator Foran's bill and the Governor's statement that he is not willing to approve any increased taxes. It was concluded that a lot of local support will be needed to solve this problem in the foreseeable future. If action is delayed the streets will deteriorate further and cost many times more to reconstruct.

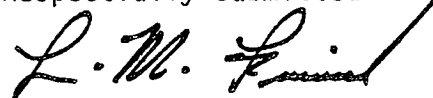
FINANCIAL DATA:

This report recommends that an additional \$1,000,000 per year of local funds be appropriated for street maintenance to make up for past shortfalls. This is in addition to any funds that might be forthcoming from a gas tax increase.

RECOMMENDATION:

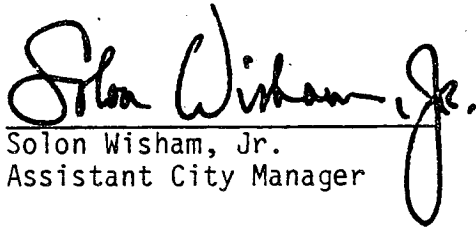
This report is being presented for general transportation information which should be considered during the forthcoming budget hearings.

Respectfully submitted



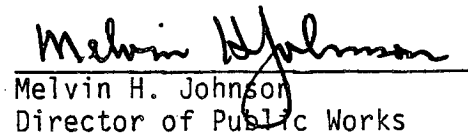
L. M. FRINK
Deputy Director of Public Works

Recommendation Approved:



Solon Wisham, Jr.
Assistant City Manager

Approved:



Melvin H. Johnson
Director of Public Works

THE

STREET

MAINTENANCE

STORY

T H E

S T R E E T

M A I N T E N A N C E

S T O R Y

City of Sacramento
Public Works Department

January 1985

THE STREET MAINTENANCE STORY

PREVENTATIVE MAINTENANCE

Whenever you brush your teeth, change the oil in your car or paint your house you are performing preventative maintenance. The cost and effort associated with doing these things is much less than the consequences of not doing them. The same is true of Street Maintenance. Based on figures published by The Road Information Program of Washington D.C., it costs 3 1/2 times more to reconstruct a road every 20 years than the cost of an adequate preventative maintenance program.

For the first time in many years, the City budgeted "adequate" funds for Street Maintenance in 1984-85. Significant preventative maintenance was undertaken with the \$1,170,000 budgeted for slurry seals and overlays. After many years of observing a program of only repairing damaged streets, some people are asking why we are fixing streets that do not appear to have anything wrong with them. The answer is we are performing preventative maintenance so they will continue to not have anything wrong with them.

PAVEMENT FAILURE

When an asphalt pavement is first constructed, it is moist, flexible and it seals the subbase against water infiltration. The subbase is the real road that carries the traffic loads. The asphalt pavement is primarily a wearing course and a seal coat.

As asphalt ages it dries out and shrinks. Hairline cracks begin to appear and if no maintenance is provided, water begins to get through to the subbase. Gradually the cracks grow and if nothing is done, potholes begin to appear. Eventually the pavement will break up completely resulting in a gravel road with chunks of asphalt intermixed with the rock.

A good preventative maintenance program avoids these failures. This is generally accomplished by placing a couple of seal coats and a thin overlay over the road during each 20 year period. The various types of maintenance treatments are described at the end of this report.

Roadway surfaces sometimes fail other than just by aging. Inadequate design for the wheel loads or improper construction of the subbase or surface can cause a relatively new road to break up quickly. Improper crowning of the surface that allows puddles to form will accelerate base failure as soon as hairline cracks develop. Finally, inadequately compacted utility trenches cause local failure which can quickly spread by allowing water into the surrounding subbase.

THE SACRAMENTO PROGRAM

In the early to mid 1970's, the City of Sacramento had an adequate street maintenance program including both repair and preventative maintenance. The streets were in good condition compared to most cities. By 1984, however, hundreds of miles of streets were criss-crossed with major cracks, potholes were developing at many locations and the Street Maintenance Division was spending most of its resources patching holes, filling cracks and making other types of repairs. The villians were a combination of inflation, Proposition 13 and steadily increasing street mileage.

Some old timers claim we have not had an adequate program since the mid 1960's and the good street conditions in the early 1970's were a result of earlier programs.

The following tables and graphs summarize City of Sacramento funding levels for Street Maintenance. They are intended to show that significant increases are needed to prevent a spread of the conditions illustrated on the cover of this report. All of these photographs were taken in the City during the past year.

Table 1 shows the amount of the Street Maintenance Budget (in thousands of dollars) between 1973-74 and 1984-85. It also shows the road mileage each year and the Caltrans Highway Cost Index. The next to last column shows the amount of funds budgeted per mile of street adjusted for inflation (1973-74 dollars). The final column shows the total amount that should have been budgeted for Street Maintenance (in thousands of dollars) to keep up with inflation and increased street mileage.

TABLE 1

Year	<u>Street Maintenance</u>			<u>Road Mileage</u>	<u>Caltrans Highway Cost Index</u>	<u>Budget Per Mile Adjusted for Inflation</u>	<u>Adequate Budget(2) (1,000's)</u>
	<u>Operating Budget(1) (1,000's)</u>	<u>Overlays in CIP (1,000's)</u>	<u>Total (1,000's)</u>				
73-74	\$1,171	\$	\$1,171	\$ 930	100.0	\$1,259	\$1,171
74-75	1,439		1,439	934	147.2	1,047	1,731
75-76	1,724		1,724	937	175.1	1,051	2,066
76-77	1,753		1,753	943	152.6	1,218	1,812
77-78	1,820		1,820	962	177.6	1,065	2,151
78-79	1,543		1,543	988	202.3	772	2,517
79-80	1,788	220	2,008	1,035	259.9	746	3,367
80-81	2,157	400	2,557	1,051	273.7	889	3,622
81-82	2,316	500	2,816	1,068	313.0	842	4,209
82-83	2,387	500	2,887	1,067	275.1	984	3,696
83-84	2,655	500	3,155	1,078	283.3	1,033	3,845
84-85	3,139	1,170	<u>4,309</u>	1,090	294.6	1,342	<u>4,043</u>
			27,182				34,250
							<u>-27,182</u>
							7,068

(1) Does not include drainage, street lights, traffic signals, street cleaning, landfill or signs and markings.

(2) Amount the budget should have been to continue at 1973-74 level of expenditure.

Figure 1 is a graphic representation of the amount budgeted per mile of street in 1973-74 dollars. It shows a significant drop in the late 70's (Prop 13), then a gradual increase. However, it is not until 1984-85 that the amount reaches the levels budgeted in 1973-74 and 1976-77.

Figure 1
STREET MAINTENANCE BUDGET
Per Mile of Road

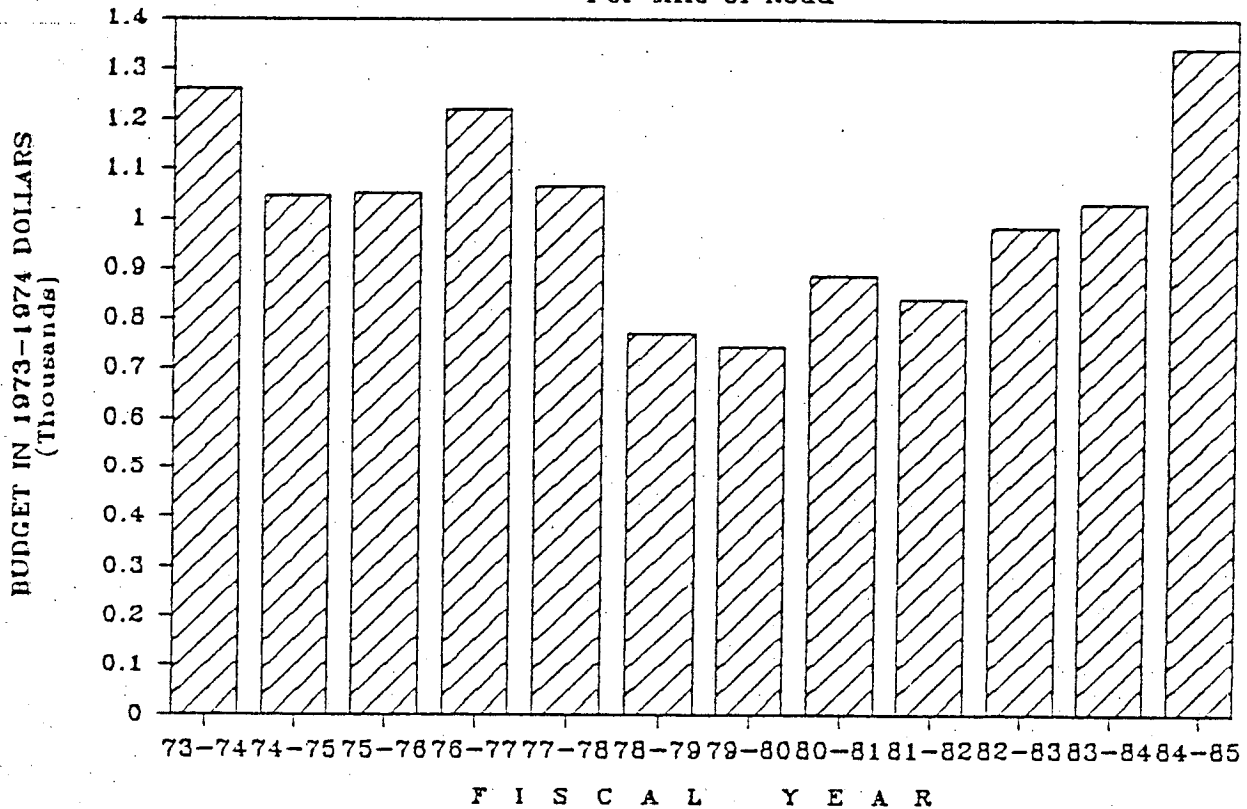


Figure 2 shows a comparison of the street funds budgeted and the amount that should have been budgeted to maintain the program at the 1973-74 level. The shaded area represents a street deficiency of about \$7,000,000. This analysis is based on the assumption that we budgeted adequate funds in the 1973-74 fiscal year. Another approach based on over 20,000,000 square yards of pavement and about \$7.00 per square yard each 15 years for maintenance indicates we should have budgeted over \$10,000,000 for the resurfacing program alone this year.

Figure 2
STREET MAINTENANCE BUDGET

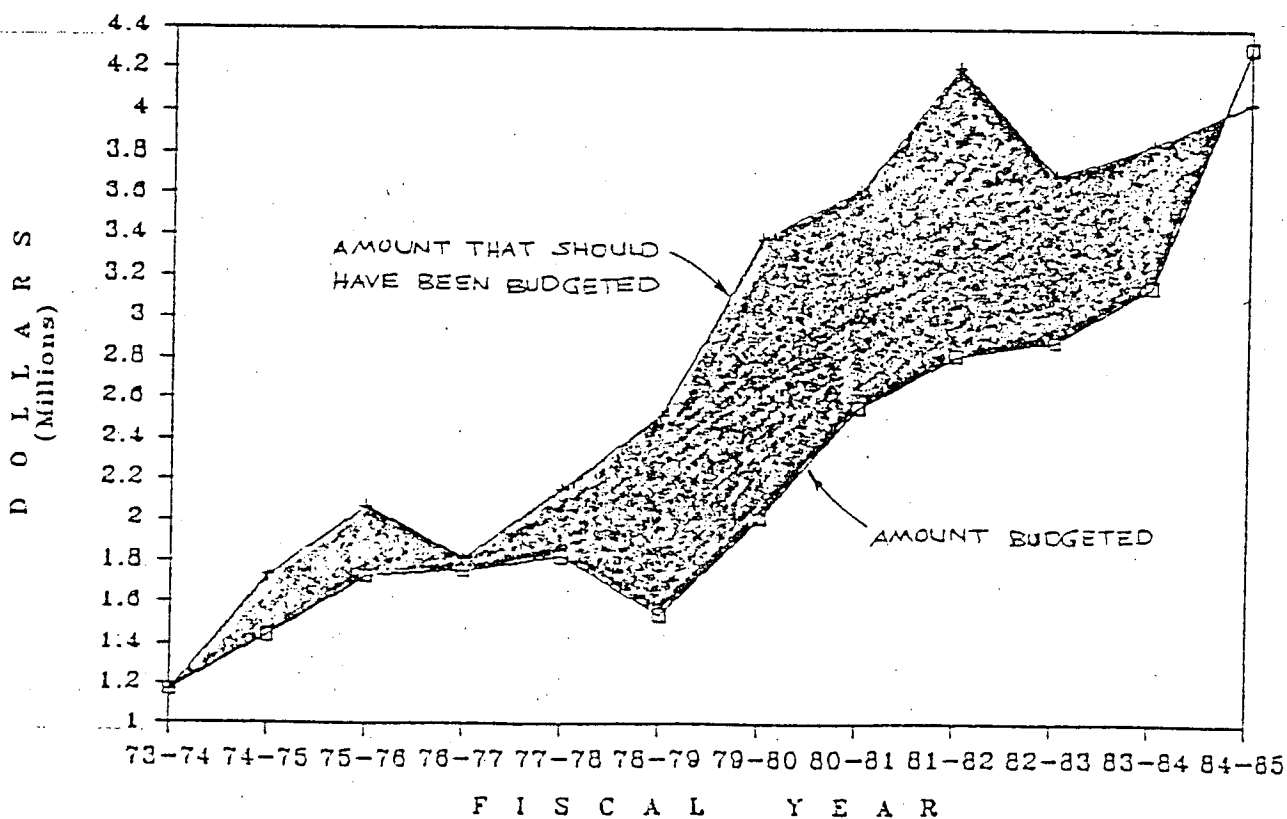


Table 2 shows the amounts that should be budgeted in future years (in thousand of dollars) assuming a 5% inflation rate, a 1.7 percent annual increase in street mileage and making up the \$7,000,000 deficiency indicated in Figure 2 over a 7 year period.

TABLE 2

<u>Year</u>	<u>Proposed Budget Adjusted for 5% Inflation</u> (1,000's)	<u>Street Mileage Adjusted for 1.7% Increase</u>	<u>Proposed Budget Adjusted for Inflation and St. Mileage</u> (1,000's)	<u>Amount Needed to Make up for Past Deficiencies</u> (1,000's)	<u>Proposed St. Maint. Budget(1)</u> (1,000's)
84-85	\$4,043	\$1,090	\$4,043	---	---
85-86	4,245	1,109	4,319	1,000	5,319
86-87	4,457	1,127	4,608	1,000	5,608
87-88	4,680	1,147	4,925	1,000	5,925
88-89	4,914	1,166	5,257	1,000	6,257
89-90	5,160	1,186	5,614	1,000	6,614
90-91	5,418	1,206	5,995	1,000	6,995
91-92	5,689	1,227	6,404	1,000	7,404
92-93	5,973	1,248	6,839	0	6,839

(1) Does not include drainage, street lights, traffic signals, street cleaning, landfill or signs and markings.

CONCLUSION

It is going to take very large expenditures to get our Street Maintenance Program back to an adequate level. The figures in Table 2 are greatly understated. As mentioned earlier in this report, it costs 3 1/2 times more to reconstruct a street than it costs to maintain it properly in the first place and an alternative calculation shows we should be budgeting about \$10,000,000 per year now. With street failures all over the City, an extra \$7,000,000 is not going to make up for the lack of past maintenance. However, without a major increase in the State Gas Tax, it would not be practical to recommend the \$5,000,000 annual increase that is really needed.

ASPHALT SURFACE TREATMENTS

PREVENTATIVE MEASURES

1. Fog Seal - A light application of emulsified asphalt, mixed with water used to prevent surface oxidation and cover hair-line cracking. This treatment requires no cover aggregate and lasts for 2 to 3 years.
2. Reclamite - This is a special emulsion of petroleum oils and resins. A light application generally spread over selected surfaces. This treatment requires a light sand cover over the entire surface to provide for safe vehicle movement. This treatment is usually done 3 to 5 years after asphalt is placed to rejuvenate the surface.
3. Sand Seal - An application of asphaltic emulsion, fine aggregate mineral filler and water placed over asphalt concrete. This mixture is uniformly spread by mechanical means at a thickness ranging from 1/8 inch to 1/4 inch. It will last about 5 years and prevents asphalt oxidation and loss of surface material.

4. Slurry Seal - Single or multiple surface treatments may be applied over aggregates or asphaltic concrete. This mixture is uniformly spread by mechanical means at a thickness ranging from 1/8 inch to 1/4 inch. It will last about 5 years and prevents asphalt oxidation and loss of surface material.

5. Chip Seal - Single or multiple surface treatments may be applied over aggregates or asphaltic concrete. This treatment can last up to 10 years. Each consists of a uniform application of asphaltic material immediately covered with clean crushed rock, with the size of the rock being determined by design. The rock must be rolled by pneumatic and steel wheel rollers.

RESTORATION MEASURES

1. Hot Surface Recycling (Heater Remix) - This treatment consists of heating and scarifying the pavement from 3/4 inch to 1 inch in depth. The pavement is then respread with a mechanical spreader and compacted with pneumatic and steel wheel rollers. This is immediately followed with an application of reclamite or its equivalent. This treatment can restore the pavement life for another 10 to 15 years, depending upon the number of cars and trucks using the street.

2. Plant-Mix Overlays - The hot asphaltic concrete is spread at thicknesses ranging from 3/4 inch to 3 inches and up, dependent on the specific condition. Prior to spreading the asphalt, a prime coat of asphalt is uniformly spread for adhesion purposes. This treatment can restore pavement life for another 10/15 years dependant on amount and type of vehicular traffic.
3. Fabric Layer - This is a petroleum based felt that is placed over minor distressed or cracked pavement to prevent reflection cracking through a 1 inch to 2 inch hot asphaltic concrete overlay. The maximum effectiveness is about 6 years, with subgrade soil stability being the prime factor influencing life expectancy.
4. Pot Hole Patching - This is a temporary repair using cut back asphalt to fill potholes until a more permanent treatment can be provided. Effective from a few hours to several years depending upon material used as well the amount and type of traffic and weather conditions.